

2. (Amended). The method of claim 1 wherein the step of varying at least one of the pulse parameters comprises varying at least two of said pulse parameters during the burst.

A2 3. (Amended). The method of claim 1 further comprising the step of applying the said at least one electrical burst in response to a detectable electrical activity of the brain.

4. (Amended). The method of claim 3 wherein said detectable electrical activity is an epileptiform electrical activity.

5. (Amended). The method of claim 3 wherein said detectable electrical activity predicts impending epileptiform electrical activity.

9. (Amended). The method of claim 7 further comprising the step of randomly varying said pulse-to-pulse interval for at least a portion of the burst.

10. (Amended). The method of claim 7 further comprising the step of pseudo-randomly varying said pulse-to-pulse interval for at least a portion of the burst.

A3 11. (Amended). The method of claim 7 further comprising the step of fractally varying said pulse-to-pulse interval for at least a portion of the burst.

12. (Amended). The method of claim 7 further comprising the step of incrementally increasing said pulse-to-pulse interval for at least a portion of the burst.

13. (Amended). The method of claim 7 further comprising the step of incrementally decreasing said pulse-to-pulse interval for at least a portion of the burst.

43 14. (Amended). The method of claim 7 further comprising the step of varying said pulse-to-pulse interval to avoid initiation of epileptiform activity.

15. (Amended). The method of claim 7 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical burst.

B2 18. (Amended). The method of claim 3 wherein said detectable electrical activity in the brain is epileptiform activity and said method further includes the step of detecting said electrical activity in the brain prior to initiating the application of said at least one electrical burst.

A4 19. (Amended). The method of claim 18 wherein said at least one pulse parameter is related to said detectable electrical activity in the brain.

20. (Amended). The method of claim 18 further including the step of determining a pulse-to-pulse interval of said electrical activity in the brain prior to initiating said at least one electrical burst.

22. (Amended). The method of claim 20 wherein the at least one pulse parameter is pulse-to-pulse interval and further comprising the step of varying said pulse-to-pulse interval in length to between about 10% and about 400% of said epileptiform pulse-to-pulse interval.

24. (Amended). The method of claim 23 further comprising the step of randomly varying said pulse amplitude for at least a portion of the burst.

25. (Amended). The method of claim 23 further comprising the step of pseudo-randomly varying said pulse amplitude for at least a portion of the burst.

26. (Amended). The method of claim 23 further comprising the step of fractally varying said pulse amplitude for at least a portion of the burst.

27. (Amended). The method of claim 23 further comprising the step of incrementally increasing said pulse amplitude for at least a portion of the burst.

28. (Amended). The method of claim 23 further comprising the step of incrementally decreasing said pulse amplitude for at least a portion of the burst.

29. (Amended). The method of claim 23 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical burst.

33. (Amended). The method of claim 32 further comprising the step of randomly

47 varying said pulse width for at least a portion of the burst.

34. (Amended). The method of claim 32 further comprising the step of pseudo-randomly varying said pulse width for at least a portion of the burst.

35. (Amended). The method of claim 32 further comprising the step of fractally varying said pulse width for at least a portion of the burst.

36. (Amended). The method of claim 32 further comprising the step of incrementally increasing said pulse width for at least a portion of the burst.

37. (Amended). The method of claim 32 further comprising the step of incrementally decreasing said pulse width for at least a portion of the burst.

38. (Amended). The method of claim 32 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating said at least one electrical burst.

41. (Amended). The method of claim 3 wherein said detectable electrical activity in the brain is epileptiform activity and said method further includes the steps of:

AS detecting said electrical activity in the brain prior to initiating said at least one electrical burst;

determining both an interval of said electrical activity in the brain prior to initiating said at least one electrical burst and a characteristic of the electrical activity; and

delaying the initiation of said at least one electrical burst after the onset of the characteristic of the electrical activity for a period of time between 5% and about 100% of said interval of said electrical activity,

42. (Amended). The method of claim 3 wherein said detectable electrical activity is an epileptiform electrical activity, said method further comprising the steps of:

detecting said electrical activity in the brain after the application of said at least one electrical burst; and

analyzing said electrical activity for epileptiform activity to produce a re-analyzed electrical activity.

43. (Amended). The method of claim 42 wherein said re-analyzed electrical activity comprises epileptiform electrical activity, said method comprising the further steps of:

re-applying to said brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters; and

varying at least one of the pulse parameters during the re-applied at least one electrical burst.

A8 44. (Amended). The method of claim 43 wherein the at least one pulse parameters varied in said re-applied at least one electrical burst are different than the pulse parameters varied in an earlier at least one electrical burst.

46. (Amended). A method for treating an abnormal neurological condition comprising the steps of:
applying to brain tissue, electrical bursts comprising a multiplicity of pulses independently to different electrodes spatially separated in a brain, said pulses having pulse parameters and said application of electrical bursts being in response to a detectable electrical activity; and
varying at least one of the pulse parameters independently during the bursts.

A9 47. (Amended). The method of claim 46 further comprising delivering said multiplicity of pulses simultaneously to said electrodes.

48. (Amended). The method of claim 46 further comprising delivering said multiplicity of pulses to said electrodes, said electrodes being configured to treat a multi-focal epilepsy.

49. (Amended). The method of claim 46 wherein said electrical activity is an epileptiform electrical activity and wherein said electrodes are located near an epileptogenic focus, said method further comprising applying comparatively lower amplitude pulses to electrodes spatially closer to the epileptogenic focus.

51. (Amended). The implantable neurostimulator of claim 50 further comprising at

A10 least a first brain electrical activity sensor for sensing electrical activity in a brain.

54. (Amended). The implantable neurostimulator of claim 50 wherein said first

electrical signal source is configured to deliver a hyper-polarizing pulse to brain tissue prior to

A11 initiating the application of said at least one electrical burst.

57. (Amended). The implantable neurostimulator of claim 51 wherein said at least a

first brain electrical activity sensor is configured to detect epileptiform activity prior to initiating

the application of said at least one electrical burst.

A12 58. (Amended). The implantable neurostimulator of claim 51 wherein said at least a

first brain electrical activity sensor is configured to determine the epileptiform pulse-to-pulse

interval of said electrical activity in the brain prior to initiating the application of said at least one

electrical burst.

60. (Amended). The implantable neurostimulator of claim 58 wherein said first

electrical signal source is configured to again apply at least one electrical burst comprising a

A13 multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse

parameters vary during the burst, when said at least a first brain electrical activity sensor detects

epileptiform electrical activity after application of said first electrical burst.

62. (Amended). The implantable neurostimulator of claim 51 wherein said first brain electrical activity sensor comprises multiple brain electrical activity sensors.

63. (Amended). The implantable neurostimulator of claim 62 wherein said multiple brain electrical activity sensors comprise sensors for measuring said at least one brain electrical activity of said brain simultaneously at different sites in a brain.

64. (Amended). The implantable neurostimulator of claim 62 wherein said sensors are configured to measure said brain activity at a depth within a brain.

65. (Amended). The implantable neurostimulator of claim 62 wherein said sensors are configured to measure said brain activity on a scalp.

66. (Amended). A method for treating an abnormal neurological condition comprising the steps of:

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses; and

synchronizing said at least one electrical burst to detectable electrical activity of the brain.

69. (Amended). A method for treating an abnormal neurological condition comprising the steps of:

determining the interval of an electrical signal in a brain; and

applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters related to said detected interval in the brain.

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70. (Amended). The method of claim 69 wherein the determined interval comprises epileptiform pulse-to-pulse intervals.

72. (Amended). A method for treating an abnormal neurological condition in a brain comprising the steps of :

detecting an electrical activity in a brain prior to initiating the application of at least one electrical burst;

determining the interval of said electrical activity in the brain prior to initiating the application of said at least one electrical burst; and

delaying the initiation of the application of said at least one electrical burst after the onset of the detected electrical activity for a period of time between 5% and about 100% of said interval of said electrical activity.

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73. (Amended). The method of claim 72 wherein said electrical activity is an epileptiform electrical activity, said method further comprising the steps of again detecting said electrical activity in the brain after the application of said at least one electrical burst and analyzing said electrical activity for epileptiform activity.

74. (Amended). A method for treating an abnormal neurological condition comprising the steps of:

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detecting electrical activity in the brain; and
applying to brain tissue a multiplicity of pulses having pulse parameters
independently to different electrodes spatially separated in said brain.

77. (Amended). A method for treating an abnormal neurological condition

comprising the steps of:

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detecting electrical activity in a brain; and
delivering a hyper-polarizing pulse to said brain prior to initiating the application
of at least one electrical pulse.

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81. (Amended). The method of claim 80 further comprising the steps of determining
epileptiform activity pulse-to-pulse interval and delivering at least one pulse having a pulse-to-
pulse interval in length between about 105% and about 400% of said epileptiform activity pulse-
to-pulse interval.